ALGORITHMS FOR CALCULATION OF MOISTURE AND FAT CHANGES IN RECIPES

BACKGROUND

Moisture and fat gains and losses affect the nutrient analysis of recipes. All nutrients, expressed as an amount per 100 grams of recipe product, are affected by changes in moisture and/or fat since those changes affect the total weight of the recipe product. (The recipe product is the final, as-served food resulting from the sum of all recipe ingredients and the effect of cooking or other preparation processes). In addition to the effect on final recipe weight, fat gains or losses will affect calories, total fat, saturated fat and sometimes cholesterol, minerals and fat-soluble vitamins.

SCRATCH RECIPES

For recipes prepared "from scratch," users are instructed to follow the traditional Yield Factor Method of recipe analysis, which means coding the cooking version of the recipe ingredients whenever possible. The Yield Factor Method involves using the food code for the cooked ingredient and adjusting the amounts of ingredient by using the raw-to-cooked yield. The "cooked codes" and amounts will generally reflect the losses or gains in moisture as well as the effect of cooking on other nutrients. For example, a recipe for macaroni and cheese calls for 1 lb. of dry macaroni to be boiled and the baked. The Food Buying Guide states that for Macaroni, dry enriched—1 lb. dry (3.5 cups) will yield 9.75 cups of cooked macaroni. For the purpose of nutrient analysis using the Yield Factor Method, it would be preferable to use the cooked code (CNP# 20100 Macaroni, cooked, enriched), replacing each pound of dry macaroni in the recipe with 9.75 cups of cooked macaroni.

CONVENIENCE RECIPES

Recipes prepared from convenience, partially prepared, processed and/or "as purchased" foods will be analyzed differently, since there won't be food codes for the "cooked versions" and yield data may not be available. Food manufactures will be providing data about moisture and fat changes in their products during cooking.

Moisture/Fat Change Factors are expressed as percent of the subtotal recipe weight (the sum of "raw" ingredient weights) with a positive sign (+) for a gain and a negative sign (-) for a loss. Moisture/Fat Change Factors are to be applied to the entire subtotal recipe weight, not to each ingredient or preparation step. The end user will enter the Moisture Change Factor and /or the Fat Changes Factor and the Type of Fat. The software system must factor that data into the calculations for the nutrient analysis of recipes. The "type of fat" refers to the CNP code for the fatty food (lard, beef tallow, butter, soybean oil, shortening, etc.) that best represents the type of fat contributing to the fat changes which occur during food preparation.

The nutrient analysis of the recipe is calculated from the total contribution of all ingredients. When the results are expressed per 100 gram (nutrient amount per a 100 gram portion of the final recipe product),

the weight used in calculations is the total "cooked" recipe weight (after adjustment for moisture and/or fat change), not the subtotal recipe weight (the starting sum of the raw ingredient weights).

The information on the following pages applies to the cooked recipes that use convenience, partially prepared, processed and/or "as purchased" foods, and that have data about moisture/fat changes during cooking. In these cases, users are instructed to code the recipe with the "raw" food codes and amounts. The following are examples of the methods which should be utilized by the computer software to calculate moisture and fat changes.

MOISTURE CHANGE ONLY

Examples of Recipes which are likely to have moisture changes include:

French Toast, partially prepared, heated from the frozen state (attached example of moisture loss)
Cake prepared from purchased mix (with other ingredients—eggs, water, oil, etc. included as part of the recipe).
Bread baked from frozen bread dough.
Soup mix, reconstituted and simmered. (Water is listed as an ingredient in the recipe. Some of the water in the recipe evaporates.)
Egg Noodles, cooked from dry, drained (attached example of moisture gain)

TO CALCULATE MOISTURE CHANGE, THE COMPUTER SOFTWARE MUST:

1. Display the percentage of moisture gain or loss ((a) MOISTURE CHANGE FACTOR).

2. Convert the amounts and measures of each ingredient in the recipe to weight in grams.

3. Calculate the sum of the ingredient weights in grams = (b) SUBTOTAL RECIPE WEIGHT (GM).

4. Multiply the (b) SUBTOTAL RECIPE WEIGHT (GM) times the (a) Moisture Change Factor (expressed as a decimal) to calculate the (c) MOISTURE CHANGE (GM).

5. If the recipe indicates a moisture loss, subtract the (c) MOISTURE CHANGE (GM) value from the (b) SUBTOTAL RECIPE WEIGHT (GM) value the Weight column, and from the (f) SUBTOTAL MOISTURE (GM) value under the Moisture column to determine the (d) TOTAL RECIPE WEIGHT (GM) and (e) TOTAL MOISTURE (GM).

If the recipe indicates a moisture gain, add the (c) MOISTURE CHANGE (GM) value to the (b) SUBTOTAL RECIPE WEIGHT (GM) value under the Weight column, and the (f) SUBTOTAL MOISTURE (GM) value the Moisture column to determine the (d) TOTAL RECIPE WEIGHT (GM) and (e) TOTAL MOISTURE (GM)

6. Calculate the nutrient amounts in grams per 100 grams of TOTAL RECIPE WEIGHT (GM) by dividing the total value of each nutrient by the (d) TOTAL RECIPE WEIGHT (GM) and multiplying the product by 100 grams.

7. Calculate the nutrient amounts in grams per serving by dividing the TOTAL value of each nutrient by number of serving provided by the recipe.

RECIPE: 918268 French toast, from frozen, heated – software sample (to illustrate moisture loss/no fat change)

MOISTURE/FAT GAIN/LOSS (Moisture Change Factor):
1. MOISTURE GAIN/LOSS (%):= -5.0 (a)
FAT GAIN/LOSS (%):=
TYPE OF FAT:

SERVINGS: 100.00 DESCRIPTION: 1 PIECE

INGREDIENT	AMOUNT AND MEASURE	+/-	AMOUNT AND MEASURE	TOTAL GRAMS	PERCENT
2. 1 FRENCH TOAST, FRZ, RTH	100.000	1 piece (59 GM before cooking)		5900.00	100.00

INGREDIENT	WEIGHT GM	ENERGY KCAL	MOISTURE GM	PROTEIN GM	CARBOHYDRATE GM	DIETARY FIBER GM
1 FRENCH TOAST, FRZ, RTH	5900.000	12567.000	3103.400	436.600	1893.900	65.490
3. SUBTOTALS:	5900.000 (b)	12567.000	3103.400 (f)	436.600	1893.900	65.490
4. MOIS/FAT CHANGE:	- 295.000 (c)	0.000	- 295.000 (c)	0.000	0.000	0.000
5. TOTAL:	5605.000 (d)	12567.000	2808.400 (e)	436.600	1893.900	65.490
6. PER 100 GRAMS:	100.000	224.211	50.105	7.789	33.789	1.168
7. PER SERVING:	56.050	125.670	28.084	4.366	18.939	0.655

INGREDIENT	TOTAL FAT GM	SATURATED FAT GM	CHOLESTEROL MG	ASH GM	VITAMIN A-IU IU	VITAMIN A-RE RE
1 FRENCH TOAST, FRZ, RTH	359.900	114.814	4838.000	106.200	11033.000	3186.000
3. SUBTOTALS:	359.900	114.814	4838.000	106.200	11033.000	3186.000
4. MOIS/FAT CHANGE:	0.000	0.000	0.000	0.000	0.000	0.000
5. TOTAL:	359.000	114.814	4838.000	106.200	11033.000	3186.000
6. PER 100 GRAMS:	6.421	2.048	86.316	1.895	196.842	56.842
7. PER SERVING:	3.599	1.148	48.380	1.062	110.330	31.860

RECIPE: 918268 French toast, from frozen, heated

INGREDIENT	VITAMIN C MG	CALCIUM MG	IRON MG	SODIUM MG
1 FRENCH TOAST, FRZ, RTH	29.500	6313.000	130.390	29205.000
3. SUBTOTALS	29.500	6313.000	130.390	29205.000
4. MOIS/FAT CHANGE:	0.000	0.000	0.000	0.000
5. TOTAL:	29.500	6313.000	130.390	29205.000
6. PER 100 GRAMS:	0.526	112.632	2.326	521.053
7. PER SERVING	0.295	63.130	1.304	292.050

NOTE: Added 1/11/05

The values for vitamin A and saturated fat for CND#18268 (French Toast, from frozen, heated) were modified on 2/12/1999. The value for saturated fat was changed to 1.533 g per 100g and the value for vitamin C was changed to .300 per 100 grams. The corrected values for vitamin C and saturated fat using the new values are listed below:

INGREDIENT	VITAMIN C MG	SATURATED FAT GM
1 FRENCH TOAST, FRZ, RTH	17.700	90.447
3. SUBTOTALS	17.700	90.447
4. MOIS/FAT CHANGE:	0.000	0.000
5. TOTAL:	17.7	90.447
6. PER 100 GRAMS:	0.316	1.6137
7. PER SERVING	0.177	.9045

RECIPE: 920109 Egg noodles, cooked from dry, drained—software sample
(to illustrate moisture gain/no fat change) Note – real moisture gain will be different.

1. MOISTURE/FAT GAIN/LOSS (Moisture Change Factor)
MOISTURE GAIN/LOSS (%): 99.0 (a)
FAT GAIN/LOSS (%):
TYPE OF FAT:

SERVINGS: 100.00 DESCRIPTION: 1 serving (approx 1 cup)

INGREDIENT	AMOUNT AND MEASURE	+/-	AMOUNT AND MEASURE	TOTAL GARMS	PERCENT
2. NOODLES, EGG, DRY, ENR	7.500 LB			3402.000	100.00

INGREDIENT	WEIGHT GM	ENERGY KCAL	MOSITURE GM	PROTEIN GM	CARBOHYDRATE GM	DIETARY FIBER GM
NOODLES, EGG, DRY. ENR	3402.000	12961.620	328.973	476.960	2419.843	91.854
3. SUBTOTALS:	3402.000 (b)	12961.620	328.973 (f)	476.960	2419.843	91.854
4. MOIS/FAT CHANGE:	3367.980 ©	0.000	3367.980 ©	0.000	0.000	0.000
5. TOTAL:	6769.980 (d)	12961.620	3696.953 (e)	476.960	2419.843	91.854
6. PER 100 GRAMS	100.000	191.457	54.608	7.045	35.744	1.357
7. PER SERVING	67.700	129.616	36.970	4.770	24.198	0.919

INGREDIENT	TOTAL FAT GM	SATURATED FAT GM	CHOLESTEROL MG	ASH GM	VITAMIN A-IU IU	VITAMIN A-RE RE
NOODLES, EGG, DRY, ENR	143.224	30.244	3231.900	32.999	2109.240	612.360
3. SUBTOTALS:	143.224	30.244	3231.900	32.999	2109.240	612.360
4. MOIS/FAT CHANGE:	0.000	0.000	0.000	0.000	0.000	0.000
5. TOTAL:	143.224	30.244	3231.000	32.000	2109.240	612.000
6. PER 100 GRAMS	2.116	0.447	47.739	0.487	31.156	9.045
7. PER SERVING:	1.432	0.302	32.319	0.330	21.092	6.124

RECIPE: 920109 Egg noodles, cooked from dry, drained

INGREDIENT	VITAMIN C MG	CALCIUM MG	IRON MG	SODIUM MG
NOODLES, EGG, DRY, ENR	0.000	1054.620	154.451	714.420
3. SUBTOTALS:	0.000	1054.620	154.451	714.420
4. MOIS/FAT CHANGE:	0.000	0.000	0.000	0.000
5. TOTAL:	0.000	1054.620	154.451	714.420
6. PER 100 GRAMS:	0.000	15.578	2.281	10.553
7. PER SERVING	0.000	10.546	1.545	7.144

NOTE: Added 1/11/05

The CND# for Egg noodles, cooked from dry, drained is #20109.

MOISTURE/LOSS/FAT LOSS

Examples of Recipes which are likely to have both moisture and fat losses include:

Baked Salisbury Steak (attached example)
Frozen Meat Patties, broiled

THE COMPUTER SOFTWARE MUST:

1. Display the percentage of moisture loss and fat loss as (a1) MOISTURE CHANGE FACTOR and (a2) FAT CHANGE FACTOR; and (a3) the Type of Fat.

2. Convert the amounts and measures of each ingredient in the recipe to weight in grams.

3. Calculate the sum of the ingredient weights in grams = (b) SUBTOTAL RECIPE WEGHT (GM)

4. Calculate the WEIGHT, MOISTURE, and FAT CHANGE (GM).

    A. WEIGHT CHANGE--If the recipe indicates a moisture loss and a fat loss, sum the losses. For example, a Moisture Loss = -14% plus a Fat Loss = -5% will equal a TOTAL CHANGE FACTOR of -19%.

    Multiply the (b) SUBTOTAL RECIPE WEIGHT (GM) times the TOTAL CHANGE FACTOR (expressed as a decimal) = (c) WEIGHT CHANGE (GM) due to MOISTURE and FAT changes.

    B. MOISTURE CHANGE--Multiply the (b) SUBTOTAL RECIPE WEIGHT (GM) times the Moisture Change Factor (expressed as a decimal) = MOISTURE CHANGE (GM) based on the weight of the “raw” recipe ingredients. Additional Moisture change value may be contributed by the moisture in the Type of Fat food. The sum of these values will equal to (d) MOISTURE CHANGE (GM). In the Baked Salisbury Steak example, the Moisture equals – 1385.283 gm of water (-10% of the weight of raw ingredients). There is no additional water lost due to the loss of shortening since that Type of Fat food contains no water.

C. FAT CHANGE--Multiply the (b) SUBTOTAL RECIPE WEIGHT (GM) times the Fat Change Factor (expressed as a decimal) = FAT CHANGE (GM) based on the weight of the "raw" recipe ingredients. This FAT CHANGE (GM) equals the amount of the specific Type of Fat food lost from the recipe during preparation.

D. CHANGE VALUES FOR NUTRIENTS RELATED TO TYPE OF FAT FOOD--Based on the Type of Fat food entered into the Type of Fat field (a3), the software must calculate the nutrient amounts (for calories, water, total fat, saturated fat, cholesterol, vitamins, and minerals) present in the amount of the specific Type of fat food. The nutrients affected will depend on the nutrients contributed by the Type of food specified. Calories, total fat and saturated fat will always be affected; cholesterol will be affected if the fat is of animal origin; water, fat soluble vitamins and some minerals may also be affected. In the Baked Salisbury Steak example, the fat change (-5%) equals the loss of 494.744 gm of shortening (Type of Fat food), which equals a loss of (e) 494.744 gm of Total Fat (since shortening is 100% fat), and a loss of 222.140 gm of Saturated Fat (the amount of Saturated Fat present in 494.7 gm of shortening (CNP #4550)).

5. Calculate the TOTAL values.

A. TOTAL RECIPE WEIGHT--Subtract the (c) WEIGHT CHANGE (GM) from the (b) SUBTOTAL RECIPE WEIGHT (GM) value = (f) TOTAL RECIPE WEIGHT (GM).

B. TOTAL MOISTURE--Subtract the (d) MOISTURE CHANGE (GM) from the (g) SUBTOTAL MOISTURE (GM) value = (h) TOTAL MOISTURE (GM).

C. TOTALS for other nutrients--Based on the Type of Fat entered into the Type of Fat field (a3), the software must calculate the TOTAL values for calories, total fat, saturated fat, cholesterol, vitamins and minerals. The amounts of each nutrient provided by the Type of Fat food will be subtracted from the subtotal nutrient amounts (sum of the nutrient contribution of each "raw" ingredient) to determine the TOTAL values of these nutrients. The nutrients affected will depend on the nutrients

contributed by the Type of Fat food specified. In the Baked Salisbury Steak example, 222.140gm (k) of Saturated Fat, is subtracted from the 659.085 gm (l) Saturated Fat SUBTOTAL to calculate the TOTAL VALUE of 436.945 gm (m) of Saturated Fat.

6. Calculate the nutrient amounts in grams per 100 grams of the TOTAL RECIPE WEIGHT (GM) by dividing the Total value of each nutrient by the (f) TOTAL RECIPE WEIGHT (GM) and multiplying the product by 100 grams.

7. Calculate the nutrient amounts in grams per serving by dividing the TOTAL value of each nutrient by the number of servings provided by the recipe.

RECIPE: 29001 Baked Salisbury Steak (with raw ingredients & moisture/fat change factors)
To illustrate moisture loss and fat loss

1. MOISTURE/FAT GAIN/LOSS (Moisture Change Factors)
MOISTURE GAIN/LOSS (%): - 14.0 (a1)
FAT GAIN/LOSS (%): -5.0 (a2)
TYPE OF FAT: 4550 SHORTENING, FRYING (HVY DTY), BEEF TALLOW&C (a3)

SERVINGS: 100.00 DESCRIPTION: 1 patty

2. INGREDIENTS	AMOUNT AND MEAURE	+/-	AMOUNT AND MEASURE	TOTAL GRAMS	PRECENT
1 BF, GROUND, LN, RAW	17.000 LB			7711.200	77.93
2 CEREAL, OATS, WO/FORT, DRY	1.000 LB	+	8.000 OZ	680.400	6.88
3 EGGS, CHICK, WHL, RAW/FRZ	10.500 OZ			297.675	3.01
4 WATER, MUNICIPAL	2.000 C			474.000	4.79
5 SOUP, BF BROTH/BOUILLON, PD	2.000 C			488.000	4.93
6 MILK, DRY, NON FAT SOL, REG	4.500 C			127.575	1.29
7 ONIONS, DEHYD FLAKES	3.500 OZ			99.225	1.00
8 PARSELY, DRIED	0.500 C			10.400	0.11
9 PEPPER, BLACK	1.000 TB			6.400	0.06

INGREDIENT	WEIGHT GM	ENERGY KCAL	MOISTURE GM	PROTEIN GM	CARBOHYDRATE GM	DIETARY FIBER GM
1 BF, GROUND, LN, RAW	7711.200	20357.568	4640.600	1364.111	0.000	0.000
2 CREALS, OATS, WO/FORT,DRY	680.400	2612.736	59.875	108.864	455.868	72.122
3 EGGS, CHICK, WHL, RAW/FRZ	297.675	443.536	224.239	37.108	3.632	0.000
4 WATER, MUNICIPAL	474.000	0.000	473.526	0.000	0.000	0.000
5 SOUP, BF BROTH/BOUILLON, PD	488.000	39.040	472.091	2.538	3.758	0.000
6 MILK, DRY, NON FAT SOL, REG	127.575	462.248	4.031	46.131	66.313	0.000
7 ONIONS, DEHYD FLAKES	99.225	320.497	3.900	8.881	82.635	9.129
8 PARSELY, DRIED	10.400	28.726	0.938	2.332	5.372	1.071
9 PEPPER, BLACK	6.400	16.320	0.673	0.701	4.148	1.696
3. SUBTOTALS:	9894.875 (b)	24280.671	5879.873 (g)	1570.737	621.726	84.018
4. MOIS/FAT CHANGE:	-1880.026 ©	-4452.694	-1385.283 (d)	-0.000	-0.000	-0.000
5. TOTAL:	8014.849 (f)	19827.977	4494.590 (h)	1570.737	621.726	84.018
6. PER 100 GRAMS	100.000	247.391	56.078	19.598	7.757	1.048
7. PER SERVING:	84.148	198.280	44.946	15.707	6.217	0.840

RECIPE: 29001 BAKED SALISBURY STEAK

INGREDIENT	TOTAL FAT GM	SATURATED FAT GM	CHOLESTEROL MG	ASH GM	VITAMIN A-IU IU	VITAMIN A-RE RE
1 BF, GROUND, LN, RAW	1593.905	640.801	5783.400	72.485	0.000	0.000
2 CEREAL, OATS, WO/FORT. DRY	42.865	7.552	-0.000	12.928	687.204	68.040
3 EGGS, CHICK, WHL, RAW/FRZ	29.827	9.228	1265.119	2.798	1890.236	568.559
4 WATER , MUNICIPAL	0.000	0.000	-0.000	0.474	0.000	0.000
5 SOUP, BF BROTH/BOUILLON, PD	1.415	0.688	-0.000	8.150	9.760	0.000
6 MILK, DRY, NON FAT SOL, REG	0.982	0.637	25.005	10.117	45.927	10.206
7 ONIONS, DEHYD FLAKES	0.456	0.077	-0.000	3.354	0.000	0.000
8 PARSLEY, DRIED	0.461	0.040	-0.000	1.297	2427.360	242.736
9 PEPPER, BLACK	0.209	0.063	0.000	0.277	12.160	1.216
3. SUBTOTALS:	1670.121 (i)	659.085 (l)	7073.523	111.879	5072.647	890.757
4. MOIS/FAT CHANGE	- 494.744 (e)	-222.140 (k)	-494.744	-0.000	-0.000	-0.000
5. TOTAL:	1175.377 (j)	436.945 (m)	6578.780	111.879	5072.647	890.757
6. PER 100 GRAMS:	14.665	5.452	82.082	1.396	63.291	11.114
7. PER SERVING:	11.754	4.369	65.788	1.119	50.726	8.908

INGREDIENT	VITAMIN C MG	CALCIUM MG	IRON MG	SODIUM MG
1 BF, GROUND, LN, RAW	0.000	616.896	136.488	5320.728
2 CEREAL, OATS, WO/FORT. DRY	0.000	353.808	28.577	27.216
3 EGGS, CHICK, WHL, RAW/FRZ	0.000	145.861	4.287	375.071
4 WATER , MUNICIPAL	0.000	9.480	0.047	14.220
5 SOUP, BF BROTH/BOUILLON, PD	0.000	19.520	0.049	2723.040
6 MILK, DRY, NON FAT SOL, REG	8.624	1603.490	- 0.408	682.909
7 ONIONS, DEHYD FLAKES	74.419	255.008	1.538	20.837
8 PARSLEY, DRIED	12.692	152.634	10.177	46.993
9 PEPPER, BLACK	1.344	27.945	-1.847	2.816
3. SUBTOTALS:	97.079	3187.642	183.418	9213.830
4. MOIS/FAT CHANGE	-0.000	- 0.000	-0.000	- 0.000
5. TOTAL:	97.079	3187.642	183.418	9213.830
6. PER 100 GRAMS:	1.211	39.734	2.288	114.959
7. PER SERVING	0.971	31.846	1.834	92.138

NOTES: Added 1/11/05

The CND#s for the ingredients in Baked Salisbury Steak are:

1 BF, GROUND, LN, RAW	#13302
2 CEREAL, OATS, WO/FORT. DRY	# 8120
3 EGGS, CHICK, WHL, RAW/FRZ	# 1123
4 WATER , MUNICIPAL	#14429
5 SOUP, BF BROTH/BOUILLON, PD	# 6475
6 MILK, DRY, NON FAT SOL, REG	#1091
7 ONIONS, DEHYD FLAKES	#11284
8 PARSLEY, DRIED	#2029
9 PEPPER, BLACK	#2030

The value for vitamin A in IU for CND#8120 (Cereal, oats, wo/fort, dry) was modified on 3/31/2004. The value for vitamin A in IU was changed to 0 IU per 100g. The corrected value for vitamin A (IU) per serving of Baked Salisbury Steak using the new values is: 43.856 IU.

MOSITURE LOSS/FAT GAIN

Examples of Recipes which are likely to have a moisture loss and a fat gain include:

Potatoes, French-fried from frozen, cooked in fat (attached example)

THE COMPUTER SOFTWARE MUST:

1. Display the percentage of moisture loss and fat gain as (a1) MOISTURE CHANGE FACTOR and (a2) FAT CHANGE FACTOR; and the (a3) Type of Fat.

2. Convert the amounts and measures of each ingredient in the recipe to weight in grams.

3. Calculate the sum of the ingredient weights in grams = (b) SUBTOTAL RECIPE WEIGHT (GM).

4. Calculate the WEIGHT, MOISTURE, and FAT CHANGES (GM).

   A. WEIGHT CHANGE--If the recipe indicates a moisture loss and a fat gain, sum the change factors to calculate a Net Change Factor. In the French Fried Potatoes example, a moisture Loss = -10% plus a Fat Gain = +5 % will equals a TOTAL CHANGE FACTOR of – 5%

      Multiply the (b) SUBTOTAL RECIPE WEIGHT (GM) times the TOTAL CHANGE FACTOR (expressed as a decimal) = (c) WEIGHT CHANGE (GM) due to MOISTURE and FAT changes.

   B. MOISTURE CHANGE—Multiply the (b) SUBTOTAL RECIPE WEIGHT (GM) times the Moisture Change Factor (expressed as a decimal) = Moisture change based on the weight of the “raw” recipe ingredients. Additional Moisture change value may be contributed by the moisture in the Type of Fat food. The sum of these values will equal the (d) MOISTURE CHANGE (GM). In the French Fried Potatoes example, the Moisture Change equals the sum of -567 gm of water lost based on 10% of the weight of the raw ingredients and 44.99 gm of water contributed by the gain of 283.5 gm of butter, to equal a MOISTURE CHANGE (d) of -522.009 gm.

C. FAT CHANGE—Multiply the (b) SUBTOTAL RECIPE WEIGHT (GM) times the Fat Change Factor (expressed as a decimal) =FAT CHANGE (GM) based on the weight of the “raw” recipe ingredients. This FAT CHANGE (GM) equals the amount of the specific Type of Fat food in the recipe during preparation.

D. CHANGE VALUES FOR NUTRIENTS RELATED TO TYPE OF FAT FOOD--Based on the Type of Fat entered into the Type of Fat field (a3), the software must calculate the nutrient amounts (for calories, water, total fat, saturated fat, cholesterol, vitamins, and minerals) present in the amount of the specific Type of Fat food. The nutrients affected will depend on the nutrients contributed by the Type of Fat food specified. Calories, total fat and saturated fat will always be affected; cholesterol will be affected it the fat is of animal origin; water, fat soluble vitamins and some minerals may also be affected. In the French Fried Potatoes example, the fat change (5%) equals a gain of 283.5 gm of butter (Type of Fat food), which contributes 229.947 gm of Total Fat (e), and 143.136 gm of Saturated Fat (k) (amounts of Total Fat and Saturated Fat present in 283.5 gm of butter (CNP# 1002)).

5. Calculate the TOTAL VALUES.

A. TOTAL RECIPE WEIGHT--Subtract the (c) WEIGHT CHANGE (GM) from the (b) SUBTOTAL RECIPE WEIGHT (GM) value = (f) TOTAL RECIPE WEIGHT (GM).

B. TOTAL MOISTURE--Subtract the (d) MOISTURE CHANGE (GM) from the (g) SUBTOTAL MOISTURE (GM) value = (h) TOTAL MOISTURE (GM).

C. TOTALS for other nutrients--Based on the Type of Fat entered into the Type of Fat Field (a3), the software will calculate the TOTAL values for calories, total fat, saturated fat, cholesterol, vitamins, and minerals. This value is calculated by adding the SUBTOTAL nutrient amounts (sum of the nutrient contribution of each “raw” ingredient) to the amounts of each nutrient contributed by the Type of Fat food. The nutrients affected will depend on the nutrients contributed by the Type of Fat food specified. In the French Fried Potatoes example, the 143.136 gm (k) of Saturated Fat provided by butter (Type of Fat) is added to 2.325 gm (l) (Saturated Fat

SUBTOTAL) to calculate the TOTAL VALUE for SATURATED FAT of 145.461 gm (m).

6. Calculate the nutrient amounts in grams per 100 grams of the TOTAL RECIPE WEIGHT (GM) by dividing the Total value of each nutrient by the (f) TOTAL RECIPE WEIGHT (GM) and multiplying the product by 100 grams.

7. Calculate the nutrient amounts in grams per serving by dividing the TOTAL values of each nutrient by the number of servings provided by the recipe.

RECIPE: 11402 Potatoes, French-fried from frozen, in whipped butter-sample
(to illustrate moisture loss and fat gain) (Note: Moisture and Fat change values are fictitious. Type of Fat is not realistic, but is used for example purposes).

1. MOISTURE/FAT GAIN/LOSS (Moisture Change Factor)
MOISTURE GAIN/LOSS (%): -10.0 (a1)
FAT GAIN/LOSS (%): 5.0 (a2)
TYPE OF FAT: 1002 BUTTER, WHIPPED (a3)

SERVINGS: 100.00 DESCRIPTION: 1 SERVING (approximately 2 oz.)

INGREDIENT	AMOUNT AND MEASURE	+/-	AMOUNT AND MEASURE	TOTAL GRAMS	PERCENT
2. 1 POTATOES, FRZ, WHL	12.500 LB			5670.000	100.00

INGREDIENT	WEIGHT GM	ENERGY KCAL	MOISTURE GM	PROTEIN GM	CARBOHYDRATE GM	DIETARY FIBER GM
1 POTATOES,FRZ, WHL	5670.000	4422.600	4496.310	134.946	991.116	158.760
3. SUBTOTALS:	5670.000 (b)	4422.600	4496.310 (g)	134.946	991.116	158.760
4. MOIS/FAT CHANGE:	-283.500 (c)	2032.179	-522.009 (d)	2.410	0.170	0.000
5. TOTAL:	5386.500 (f)	6454.779	3974.301 (h)	137.356	991.286	158.760
6. PER 100 GRAMS:	100.000	119.833	73.783	2.550	18.403	2.947
7. PER SERVING:	53.865	64.548	39.743	1.374	9.913	1.588

INGREDIENT	TOTAL FAT GM	SATURATED FAT GM	CHOLESTEROL MG	ASH GM	VITAMIN A-IU IU	VITAMIN A-RE RE
1 POTATOES, FRZ, WHL	9.072	2..325	0.000	39.123	0.000	0.000
3. SUBTOTAL:	9.072 (i)	2..325 (l)	0.000	39.123	0.000	0.000
4. MOIS/FAT CHANGE	229.947 (e)	143.136 (k)	620.582	5.982	8669.430	2137.590
5. TOTAL:	239.019 (j)	145.461 (m)	620.582	45.105	8669.430	2137.590
6. PER 100 GRAMS	4.437	2.700	11.521	0.837	160.947	39.684
7. PER SERVING:	2.390	1.455	6.206	0.451	86.694	21.376

INGREDIENT	VITAMIN C MG	CALCIUM MG	IRON MG	SODIUM MG
1 POTATOES, FRZ, WHL	805.140	453.600	57.267	1417.500
3. SUBTOTALS:	805.140	453.600	57.267	1417.500
4. MOIS/FAT CHANGE:	0.000	66.623	0.454	2343.128
5. TOTAL:	805.140	520.223	57.721	3760.628
6. PER 100 GRAMS:	14.947	9.658	1.072	69.816
7. PER SERVING	8.051	5.202	0.577	37.606

Note: (1/11/2005)

CND#11402 Potatoes, Fzn, Whl is no longer in the Child Nutrition Database.

Note: (7/5/2006)

This document was originally distributed as part of a packet of seven guidance documents for software developers. The original was dated May 17, 1995 and signed by Ron Vogel. A copy of the original letter is included in the packet of materials sent to new software developers. The letter and packet are available upon request. This Word document was created January 11, 2005.